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June 18, 2012

To: Supervisor Zev Yaroslavsky, Chairman
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From: William T Fujioka
Chief Executive Officer

STATUS REPORT ON LOS ANGELES COUNTY DISASTER RECOVERY DATA CENTER (ITEM 10, AGENDA OF MAY 15, 2012)

On May 15, 2012, the Board, on motion of Supervisor Knabe, instructed the Chief Executive Office (CEO), in conjunction with the Chief Information Officer (CIO) and the Director of the Internal Services Department (ISD), to:

1. Report back within 30 days with a preliminary report on a recommended site, cost estimates, expedited project timeline and funding or financing approach to create a Los Angeles County disaster recovery center to be used by all County departments;

2. Explore other options outside of constructing a facility, i.e., a "cloud"; analyzing how the County might achieve economies-of-scale, and easier manageability and maintenance, while ensuring a secure environment for the County's critical data;

3. Include in the report operational and energy efficiencies, cost savings and/or cost avoidance associated with the project; and

4. Develop directives and policies needed to implement a Los Angeles County Disaster Recovery Center.

This memorandum provides a progress report to create a Los Angeles County Disaster Recovery Data Center.

BACKGROUND

Since decentralization of information technology began in the late 1980's, most County departments began to acquire and operate computers from their own facilities. Some departments have taken action to secure their computer systems, but few have made the kind of operating or facility provisions that enable continued operations during a disaster, such as a fire, flood, power outage, or earthquake.

Based on a survey conducted by the CIO, County departments reported that they operate a total of 64 computer rooms or data centers. Of these, 60 percent of data centers do not have backup generators in the event of a power outage, 41 percent of the departments' self-identified critical business applications are not recoverable after a disaster, and 78 percent do not backup data from their main data center to a disaster recovery site.

For County applications that are hosted by ISD at its Downey data center, ISD provides disaster recovery (DR) services at its Local Recover Center (LRC). The LRC includes County-owned and dedicated computers and storage units housed at leased space within the Orange County data center in Santa Ana.

ISD's approach to DR is to ensure that all critical data in the Downey data center is duplicated within disc storage devices at the LRC. This enables quick operational recovery at the LRC if necessary. As an additional precaution, critical data is also stored on magnetic tape.

At the LRC, duplicate (parallel) computer systems are connected to the duplicated storage devices. In the event of a disaster affecting the Downey data center, these computers would assume the workload and continue to operate. Additionally, ISD has provisioned telecommunications networks so that departmental workstations will have connectivity to either Downey or the LRC. This provides access to systems, the Internet and to the County's business partners (e.g., banks and State systems).

The environment created by ISD within the LRC is a hot site, with full computer systems and real time synchronization to mirror the data environment of the primary Downey data center. The LRC will continue critical operation of applications and systems in the event of a local or regional emergency. This is the desired state envisioned for all County departments where critical resources are locally available in a modern computing infrastructure.

The following sections of the memo provide a status on the information acquired to date regarding the various options for IT disaster recovery service.

DISASTER RECOVERY DATA CENTER SITE REVIEW

To analyze the option of a local disaster recovery center owned and operated by the County, this Office worked with the CIO and ISD to develop a plan that will support data center consolidation by using shared infrastructure resources. Additionally, mirroring ISD's success, we evaluated potential options for a County-owned recovery center that can be quickly

constructed to provide a L.A. County hot site DR facility for all departments. The vital need for a local DR data center site was highlighted during disasters such as the 9-11 terrorist attacks or Hurricane Katrina, when transportation systems were severely restricted or completely unavailable.

The CEO, CIO and ISD are reviewing potential County sites for a disaster recovery data center based on the following criteria:

- Appropriate distance between the primary Downey data center & DR center so that both facilities would not be disrupted by a single event, such as fire, windstorm, earthquake, etc.;
- Avoidance of potential site problems, such as geotechnical issues (known faults-liquefaction), flood zones, security concerns, etc.;
- Adequate access to power, water, and network infrastructure;
- At least 15,000 square feet of available data center space;
- Ability to access the site for routine or disaster operations.

To minimize costs, the team reviewed existing County owned buildings and real estate in Lancaster, Pacoima, Castaic, and Pomona. Based on this review, the Pomona Fairplex site was identified as a potential location deserving of further analysis by the Department of Public Works (DPW). The Pomona Fairplex Association is in the process of developing a business park in this area.

DPW has engaged a consultant to conduct a feasibility study of the Pomona Fairplex location for use as a DR data center. The consultant's preliminary report identified upgrades that will be required to adapt the building for data center use. DPW is working with the consultant to refine cost and time estimates to determine the feasibility of this site. We will report the outcome of this feasibility review to your Board in our next status report.

ALTERNATIVES TO CONSTRUCTING A COUNTY- OWNED FACILITY

In addition to a review of County-owned sites, we also assessed other options for provisioning DR data center services. These options are not recommended due to their cost, availability, or suitability to meet the County's needs, as indicated below.

- Expanding and Extending the Orange County Local Recovery Center (LRC) lease. For the existing LRC, ISD leases 4,800 square feet from Orange County at an annual cost of $767,000 plus utilities. Orange County representatives have indicated that additional space could be made available. However, the data center mechanical infrastructure needs to be significantly increased to handle Los Angeles County's requirements. Even with upgrades, it would be difficult to achieve the required power efficiencies/savings at this facility. Further, the cost of leased space is expected to increase over time, and Los Angeles County requires increased space for its essential applications. Based on these factors, lease costs are projected to exceed costs for other alternatives.

- Cloud Based Recovery-as-a-Service (RaaS) and Disaster Recovery as a Service (DRaaS). The project team conducted research and consulted with Gartner, a leading information technology research and advisory firm, on both RaaS and DRaaS in the public cloud computing environment. Discussions with Gartner's analyst concluded that RaaS is currently a niche market, primarily directed for small to mid-size firms, with agreements in the range of $45,000 to $75,000 annually. Nothing is being reported with government agencies close in size and complex mix of computing platforms to the County. Additional research with leading DR vendors; such as IBM and Verizon, revealed that vendors do not typically offer support for all of the various computing systems used by the County (e.g., mainframes, UNIX computers plus high-end X86 servers). Any vendor DRaaS proposal for the County at this time would be a custom, one-of-a kind solution. Other complicating factors in considering either RaaS or DRaaS are privacy, security and telecommunication bandwidth, and physical location of the data storage.

  RaaS addresses data and system storage solutions primarily for the computer server environment. However, issues relating to privacy, security and bandwidth persist and would need to be addressed. Additionally, RaaS does not meet the hot site desired state for full disaster recovery. To be effective, RaaS requires an alternative computing facility with machines comparable to the original environment to download data and begin operation.

  The DRaaS solution has many of the same issues as RaaS relating to security and bandwidth. Additionally, County systems' size, diversity (mainframes, UNIX and high-end servers) and complexity (e.g., telecommunication service requirements to County facilities plus banks, local agencies and State extra-net connections) make DR services from an individual provider problematic and costly.

- Leasing an existing data center. In 2011, ISD worked with CEO Real Estate Division and outside brokers to identify available data centers within Los Angeles County that met basic needs at an affordable cost. A list of available sites was reviewed, including site visits as appropriate, but none were found suitable or cost effective.

- Leasing shared (co-location) space. In December 2011, a team comprised of staff from ISD, CIO, CEO and DHS visited two commercial data centers in Arizona and Nevada. These visits provided useful information regarding the efficiencies to be achieved by using modular racks (or containers) to hold mechanical and computing infrastructure. These vendors did not offer hosting services for mainframe and Unix systems and neither company met the requirement for ease of access by operational staff in the event of a disaster. The team also visited several known Los Angeles County based data center operations seeking co-location leases and found them to either be older data center designs that do not accommodate a

modular, high server density model. These offerings required a long-term commitment at a higher costs than the current LRC.

POTENTIAL OPERATIONAL AND ENERGY EFFICIENCIES

The most efficient computing environment consolidates all essential County applications into one primary data center, which would replicate data to one countywide DR data center. This structure permits servers to be consolidated and virtualized, providing large savings in hardware costs, power consumption, network infrastructure (e.g., switches, wide area network circuits), and other costs (e.g., uninterruptable power supply [UPS] systems, power distribution systems).

With support of this Office and the CIO, ISD has developed an environment for County departments that leverages server virtualization techniques and, in many ways, is analogous to what is referred to as Infrastructure as a Service (IaaS), a public Cloud offering. This technique has been proven to reduce the number of physical servers, electrical power usage, and required floor space.

Leveraging this technology, ISD will be able to host servers and systems for County departments within its data center. Additionally, this capability easily enables the transfer of systems between sites, which is ideal in a hot site disaster recovery scenario.

ISD, CIO, and CEO are developing 20-year cumulative avoided cost estimates by comparing the County's business-as-usual decentralized data center operations and decentralized DR to a centralized data center model at one countywide primary and one centralized DR data center. While the team continues to evaluate the various options for DR data center services and potential savings, the following initial cost avoidances and savings have been calculated:

Avoided costs for DR data center lease over 20 years	$18 million
Avoided costs for power over 20 years	$15 million
Shared computing savings (both primary and DR site)	$42 million
Other avoided costs over 20 years (UPS, power dist.)	$8 million
Total avoided costs over 20 years	$83 million

Reduced data center power consumption also provides environmental benefits. Projected power savings will reduce the County's production of greenhouse gases by an estimated 2,164 tons per year, or roughly 1 percent of the County's total greenhouse gas emissions reduction target for 2020.

DATA CENTER DIRECTIVES AND POLICIES

The CIO has been working with departmental information technology (IT) managers to prepare for the various stages necessary to facilitate DR. For example, server virtualization (the merger of many server computers onto one larger server) has been an activity involving most County departments for some time. This Office recently issued a directive to merge departmental email

systems and provide a single email service for all departments. The CIO's reviews of IT procurements will provide visibility to expenditures to data centers, storage, and computer equipment to ensure that purchases align with the vision and direction of this Office.

Working with this Office and the CIO's Council, the CIO will be preparing additional directives, and, where necessary, policies for Board consideration that will further cost reduction and protect County systems and assets. This effort will include potential directives for the consolidation and virtualization of data and application servers and data storage devices.

NEXT STEPS

Board deputies were provided with a briefing of the preliminary response to the motion at the June 7, 2012 Operations Cluster meeting. Several questions were raised for discussion and further research; specifically, whether the "Cloud" could perform certain aspects of the DR concept more economically, such as using data backup services in the Cloud instead of current tape backup system. The CIO and ISD will continue to meet with DR vendors to research turn-key DR solutions currently offered for agencies the size, scope and complexity of the County of Los Angeles.

In a parallel effort, the CIO will be working with departments to perform a comprehensive analysis of all County-run applications to assess their criticality and suitability for DR. Currently, it is estimated that approximately 35-40percent of the County's applications will require immediate recovery in the event of a major emergency.

This Office, ISD, and the CIO will pursue answers to the questions presented at the June 7th briefing and will continue assessing the feasibility of DR data center options to identify those providing appropriate hot-site capabilities at a reasonable cost and within identified parameters. We will continue to keep your Board informed and will provide another status report to your within 60 days.

If you have any questions regarding this matter, please contact Ellen Sandt at (213) 974-1186 or esandt@ceo.lacounty.gov

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